

Listing of Claims

1. (Currently Amended) A method of communicating with a plurality of application instances executing on a cluster of data processing systems utilizing a single Internet Protocol (IP) address, the method comprising the steps of:

notifying a distributing data processing system if an application opens a listening socket utilizing any port of multiple ports associated with the single IP address;

identifying potential target data processing systems in the cluster of data processing systems at the distributing data processing system based on the notification;

receiving a request to establish a connection to the single IP address and a port of the multiple ports associated with the single IP address at the distributing data processing system;

selecting a data processing system from the potential target data processing systems if the port associated with the request is a port of the multiple ports associated with the single IP address associated with a potential data processing system; and

routing communications for the connection to the selected data processing system.

2. (Currently Amended) ~~The method of Claim 1, further comprising A method of communicating with a plurality of application instances executing on a cluster of data processing systems utilizing a single Internet Protocol (IP) address, the method comprising the steps of:~~

notifying a distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address;

identifying potential target data processing systems in the cluster of data processing systems at the distributing data processing system based on the notification;

receiving a request to establish a connection to the single IP address and a port associated with the single IP address at the distributing data processing system;

selecting a data processing system from the potential target data processing systems if the port associated with the request is associated with a potential data processing system;

routing communications for the connection to the selected data processing system;

notifying a distributing data processing system if an application opens a listening socket utilizing an enumerated port if ports associated with the single IP address are enumerated; and

wherein notifying the distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address comprises notifying the distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address if ports are not enumerated.

3. (Currently Amended) ~~The method of Claim 1, further comprising A method of communicating with a plurality of application instances executing on a cluster of data processing systems utilizing a single Internet Protocol (IP) address, the method comprising the steps of:~~

notifying a distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address;

identifying potential target data processing systems in the cluster of data processing systems at the distributing data processing system based on the notification;

receiving a request to establish a connection to the single IP address and a port associated with the single IP address at the distributing data processing system;

selecting a data processing system from the potential target data processing systems if the port associated with the request is associated with a potential data processing system;

routing communications for the connection to the selected data processing system;

notifying a distributing data processing system if an application opens a listening socket utilizing an enumerated port of the single IP address if ports associated with the single IP address are enumerated irrespective of whether the listening socket is opened with the single IP address specifically identified; and

wherein notifying the distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address comprises notifying the distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address if the listening socket is opened with the single IP address specifically identified.

4. (Original) The method according to Claim 1, wherein the step of selecting a data processing system comprises selecting a data processing system to distribute workload between the potential target data processing systems.

5. (Currently Amended) ~~The method according to Claim 4, further comprising: A method of communicating with a plurality of application instances executing on a cluster of data processing systems utilizing a single Internet Protocol (IP) address, the method comprising the steps of:~~

notifying a distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address;

identifying potential target data processing systems in the cluster of data processing systems at the distributing data processing system based on the notification;

receiving a request to establish a connection to the single IP address and a port associated with the single IP address at the distributing data processing system;

selecting a data processing system from the potential target data processing systems if the port associated with the request is associated with a potential data processing system;

routing communications for the connection to the selected data processing system;

determining if a port associated with the received request is a unique port associated with a listening socket of an application on a data processing system within the cluster has a port associated;

selecting the data processing system associated with the unique port as a destination data processing system for the request; and

routing the request to the destination data processing system.

6. (Original) The method according to Claim 5, wherein determining if a port associated with the received request is a unique port comprises:

notifying the distributing data processing system if an application associated with a data processing system in the cluster of data processing systems opens a listening socket associated with the single IP address utilizing a unique port within the cluster of data processing systems so as to provide an identification of data processing systems associated with unique ports of the IP address; and

determining if the port associated with the received request is a unique port associated with an identified data processing system.

7. (Currently Amended) The method according to Claim 76, wherein the unique port comprises an ephemeral port.

8. (Original) The method according to Claim 1, wherein the distributing data processing system comprises a routing communication protocol stack.

9. (Original) The method according to Claim 3, further comprising:
receiving at the data processing system in the cluster of data processing systems a definition that the single IP address is a distributed address from the distributing data processing system, wherein the definition includes an indication of whether ports associated with the single IP address which are to be distributed are enumerated; and
evaluating the definition to determine if the ports associated with the single IP address are enumerated.

10.-16. Cancelled.

17. (Currently Amended) A system for communicating with a plurality of application instances executing on a cluster of data processing systems utilizing a single Internet Protocol (IP) address, comprising:

means for notifying a distributing data processing system if an application opens a listening socket utilizing any port of multiple ports associated with the single IP address;

means for identifying potential target data processing systems in the cluster of data processing systems at the distributing data processing system based on the notification;

means for receiving a request to establish a connection to the single IP address and a port of the multiple ports associated with the single IP address at the distributing data processing system;

means for selecting a data processing system from the potential target data processing systems if the port associated with the request is a port of the multiple ports

associated with the single IP address associated with a potential data processing system; and

means for routing communications for the connection to the selected data processing system:

18. (Currently Amended) ~~The system according to Claim 17, further comprising~~ A system for communicating with a plurality of application instances executing on a cluster of data processing systems utilizing a single Internet Protocol (IP) address, comprising:

means for notifying a distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address;

means for identifying potential target data processing systems in the cluster of data processing systems at the distributing data processing system based on the notification;

means for receiving a request to establish a connection to the single IP address and a port associated with the single IP address at the distributing data processing system;

means for selecting a data processing system from the potential target data processing systems if the port associated with the request is associated with a potential data processing system;

means for routing communications for the connection to the selected data processing system;

means for notifying a distributing data processing system if an application opens a listening socket utilizing an enumerated port if ports associated with the single IP address are enumerated; and

wherein the means for notifying the distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address comprises means for notifying the distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address if ports are not enumerated.

19. (Currently Amended) ~~The system according to Claim 17, further comprising~~ A system for communicating with a plurality of application instances

executing on a cluster of data processing systems utilizing a single Internet Protocol (IP) address, comprising:

means for notifying a distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address;

means for identifying potential target data processing systems in the cluster of data processing systems at the distributing data processing system based on the notification;

means for receiving a request to establish a connection to the single IP address and a port associated with the single IP address at the distributing data processing system;

means for selecting a data processing system from the potential target data processing systems if the port associated with the request is associated with a potential data processing system;

means for routing communications for the connection to the selected data processing system;

means for notifying a distributing data processing system if an application opens a listening socket utilizing an enumerated port of the single IP address if ports associated with the single IP address are enumerated irrespective of whether the listening socket is opened with the single IP address specifically identified; and

wherein the means for notifying the distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address comprises means for notifying the distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address if the listening socket is opened with the single IP address specifically identified.

20. (Original) The system according to Claim 17, wherein the means for selecting a data processing system comprises means for selecting a data processing system to distribute workload between the potential target data processing systems.

21. (Currently Amended) ~~The system according to Claim 20, further comprising:~~ A system for communicating with a plurality of application instances executing on a cluster of data processing systems utilizing a single Internet Protocol (IP) address, comprising:

means for notifying a distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address;

means for identifying potential target data processing systems in the cluster of data processing systems at the distributing data processing system based on the notification;

means for receiving a request to establish a connection to the single IP address and a port associated with the single IP address at the distributing data processing system;

means for selecting a data processing system from the potential target data processing systems if the port associated with the request is associated with a potential data processing system;

means for routing communications for the connection to the selected data processing system;

means for determining if a port associated with the received request is a unique port associated with a listening socket of an application on a data processing system within the cluster has a port associated;

means for selecting the data processing system associated with the unique port as a destination data processing system for the request; and

means for routing the request to the destination data processing system.

22. (Currently Amended) The system according to Claim 21-7, wherein the means for determining if a port associated with the received request is a unique port comprises:

means for notifying the distributing data processing system if an application associated with a data processing system in the cluster of data processing systems opens a listening socket associated with the single IP address utilizing a unique port within the cluster of data processing systems so as to provide an identification of data processing systems associated with unique ports of the IP address; and

means for determining if the port associated with the received request is a unique port associated with an identified data processing system.

23. (Original) The system according to Claim 21, wherein the unique port comprises an ephemeral port.

24. (Original) The system according to Claim 17, wherein the distributing data processing system comprises a routing communication protocol stack.

25. The system according to Claim 19, further comprising:
means for receiving at the data processing system in the cluster of data processing systems a definition that the single IP address is a distributed address from the distributing data processing system, wherein the definition includes an indication of whether ports associated with the single IP address which are to be distributed are enumerated; and

means for evaluating the definition to determine if the ports associated with the single IP address are enumerated.

26.-32. Cancelled.

33. (Currently Amended) A computer program product for communicating with a plurality of application instances executing on a cluster of data processing systems utilizing a single Internet Protocol (IP) address, comprising:

a computer readable storage media having computer readable program code embodied therein, the computer readable program code comprising:

computer readable program code configured to notify a distributing data processing system if an application opens a listening socket utilizing any port of multiple ports associated with the single IP address;

computer readable program code configured to identify potential target data processing systems in the cluster of data processing systems at the distributing data processing system based on the notification;

computer readable program code configured to receive a request to establish a connection to the single IP address and a port of the multiple ports associated with the single IP address at the distributing data processing system;

computer readable program code configured to select a data processing system from the potential target data processing systems if the port associated with the request is a port of the multiple ports associated with the single IP address associated with a potential data processing system; and

computer readable program code configured to route communications for the connection to the selected data processing system.

34. (Currently Amended) ~~The computer program product according to Claim 33, further comprising~~ A computer program product for communicating with a plurality of application instances executing on a cluster of data processing systems utilizing a single Internet Protocol (IP) address, comprising:

a computer readable storage media having computer readable program code embodied therein, the computer readable program code comprising:

computer readable program code configured to notify a distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address;

computer readable program code configured to identify potential target data processing systems in the cluster of data processing systems at the distributing data processing system based on the notification;

computer readable program code configured to receive a request to establish a connection to the single IP address and a port associated with the single IP address at the distributing data processing system;

computer readable program code configured to select a data processing system from the potential target data processing systems if the port associated with the request is associated with a potential data processing system;

computer readable program code configured to route communications for the connection to the selected data processing system;

computer readable program code configured to notify a distributing data processing system if an application opens a listening socket utilizing an enumerated port if ports associated with the single IP address are enumerated; and

wherein the computer readable program code configured to notify the distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address comprises computer readable program code configured to notify the distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address if ports are not enumerated.

35. (Currently Amended) ~~The computer program product according to Claim 33, further comprising~~ A computer program product for communicating with a plurality of application instances executing on a cluster of data processing systems utilizing a single Internet Protocol (IP) address, comprising:

a computer readable storage media having computer readable program code embodied therein, the computer readable program code comprising:

computer readable program code configured to notify a distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address;

computer readable program code configured to identify potential target data processing systems in the cluster of data processing systems at the distributing data processing system based on the notification;

computer readable program code configured to receive a request to establish a connection to the single IP address and a port associated with the single IP address at the distributing data processing system;

computer readable program code configured to select a data processing system from the potential target data processing systems if the port associated with the request is associated with a potential data processing system;

computer readable program code configured to route communications for the connection to the selected data processing system;

computer readable program code configured to notify a distributing data processing system if an application opens a listening socket utilizing an enumerated port of the single IP address if ports associated with the single IP address are enumerated irrespective of whether the listening socket is opened with the single IP address specifically identified; and

wherein the computer readable program code configured to notify the distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address comprises computer readable program code configured to notify the distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address if the listening socket is opened with the single IP address specifically identified.

36. (Original) The computer program product according to Claim 33, wherein the computer readable program code configured to select a data processing system comprises computer readable program code configured to select a data processing system to distribute workload between the potential target data processing systems.

37. (Currently Amended) ~~The computer program product according to Claim 36, further comprising: A computer program product for communicating with a plurality of application instances executing on a cluster of data processing systems utilizing a single Internet Protocol (IP) address, comprising:~~

a computer readable storage media having computer readable program code embodied therein, the computer readable program code comprising:

computer readable program code configured to notify a distributing data processing system if an application opens a listening socket utilizing any port associated with the single IP address;

computer readable program code configured to identify potential target data processing systems in the cluster of data processing systems at the distributing data processing system based on the notification;

computer readable program code configured to receive a request to establish a connection to the single IP address and a port associated with the single IP address at the distributing data processing system;

computer readable program code configured to select a data processing system from the potential target data processing systems if the port associated with the request is associated with a potential data processing system;

computer readable program code configured to route communications for the connection to the selected data processing system;

computer readable program code configured to determine if a port associated with the received request is a unique port associated with a listening socket of an application on a data processing system within the cluster has a port associated;

computer readable program code configured to select the data processing system associated with the unique port as a destination data processing system for the request;
and

computer readable program code configured to route the request to the destination data processing system.

38. (Original) The computer program product according to Claim 37, wherein the computer readable program code configured to determine if a port associated with the received request is a unique port comprises:

computer readable program code configured to notify the distributing data processing system if an application associated with a data processing system in the cluster of data processing systems opens a listening socket associated with the single IP address utilizing a unique port within the cluster of data processing systems so as to provide an identification of data processing systems associated with unique ports of the IP address; and

computer readable program code configured to determine if the port associated with the received request is a unique port associated with an identified data processing system.

39. (Original) The computer program product according to Claim 37, wherein the unique port comprises an ephemeral port.

40. (Original) The computer program product according to Claim 33, wherein the distributing data processing system comprises a routing communication protocol stack.

41. (Original) The computer program product according to Claim 35, further comprising:

computer readable program code configured to receive at the data processing system in the cluster of data processing systems a definition that the single IP address is a distributed address from the distributing data processing system, wherein the definition includes an indication of whether ports associated with the single IP address which are to be distributed are enumerated; and

computer readable program code configured to evaluate the definition to determine if the ports associated with the single IP address are enumerated.

42.-48. Cancelled.